

Claims

1. Radiation source comprising:
 - an anode (2),
 - a cathode (3, 8),
 - a space (4) for electrical discharge between the anode (2) and the cathode (3),
 - a pipe (30) for introducing gas into the discharge space (4), the gas inlet pipe (30) being electrically connected to the anode (2) or to the cathode (3, 8),
 - means (13 to 23) for producing, in the gas provided in the discharge space (4), an electrical discharge which brings about the emission of the radiation towards the outside, characterised in that the gas inlet pipe (30) is supplied with gas by a gas supply line (43) which is arranged for forming, between the portion (42) thereof which is connected to the gas inlet pipe (30) and another portion (44) thereof which is connected to a fixed potential, such an electrical impedance that the production of electrical discharges at the inside the gas inlet pipe (30) is inhibited.
2. Radiation source according to claim 1, characterised in that the fixed potential and the anode (2) are earthed and the gas inlet pipe (30) is electrically connected to the cathode (3, 8).
3. Radiation source according to either claim 1 or 2, characterised in that it further comprises a system (45) for cooling the anode (2).
4. Radiation source according to claims 2 and 3, characterised in that the cooling system (45) has a circulation of cooling fluid in or on the anode (2).

5. Radiation source according to claim 4, characterised in that the cooling fluid comprises water.

6. Radiation source according to claim 4, characterised in that the cooling fluid comprises air.

7. Radiation source according to claim 4, characterised in that the cooling fluid comprises oil.

8. Radiation source according to any one of the preceding claims, characterised in that the electrical impedance formed by the gas supply line (43) comprises an electrical inductance.

9. Radiation source according to claim 8, characterised in that the gas supply line (43) comprises, between the portion (44) thereof connected to the fixed potential and the portion (42) thereof connected to the gas inlet pipe (30), an electrically conductive material and is wound in order to form the inductance.

10. Radiation source according to claim 9, characterised in that the gas supply line (43) is wound against and with spacing from an electrically insulating assembly component (34) of the source.

11. Radiation source according to any one of the preceding claims, characterised in that the means (13 to 23) for producing discharge in the discharge space (4) comprise at least one charge storage capacitor (14) which is electrically connected, by means of a first terminal (15), to the cathode (3, 8) and, by means of a second terminal (16), to a first terminal (17) of at least one commutation capacitor (19)

which is electrically connected to the anode (2) by means of the second terminal (20) thereof, electrical commutation means being provided between the first and second terminals (18, 20) of the at least one commutation capacitor (19) and a source of charge voltage being provided between the first and second terminals (18, 20) of the at least one commutation capacitor (19).

12. Radiation source according to claim 11, characterised in that the commutation means comprise a switch which is controlled in single-pulse mode.

13. Radiation source according to claim 11, characterised in that the commutation means comprise a switch which is controlled in pulse mode at a repetition frequency less than or equal to 10kHz.

14. Radiation source according to any one of claims 11 to 13, characterised in that the source of charge voltage and the commutation means are such that the at least one charge storage capacitor (14) is charged by the source of charge voltage shortly before the commutation of the commutation means.

15. Radiation source according to any one of claims 11 to 14, characterised in that a plurality of charge storage capacitors (14) are provided, the cathode (3, 8) comprises an annular portion (8) which is connected to a central portion (6) which is connected to the discharge space (4), and the charge storage capacitors (14) are distributed around the central portion (6) and are connected, by means of the first terminal (15) thereof, to the annular portion (8) and, by means of the second terminal (16) thereof, to a conductor

ring (13) which is electrically connected to the first terminal (18) of the at least one commutation capacitor (19).

16. Radiation source according to any one of the preceding claims, characterised in that the anode (2) comprises a frustoconical hole (10) for the passage of the radiation emitted in the discharge space (4), the hole being connected, by means of the small base thereof, to the discharge space (4) and, by means of the large base thereof, towards the outside in order to allow the radiation emitted in the discharge space (4) to pass towards the outside.

17. Radiation source according to any one of claims 1 to 15, characterised in that the anode (2) comprises a central cylindrical hole for the passage of the radiation emitted in the discharge space (4), the hole being connected to the discharge space (4) in order to allow the radiation emitted in the discharge space (4) to pass towards the outside.

18. Radiation source according to any one of the preceding claims, characterised in that the cathode (3, 8) comprises a central frustoconical hole (12) for the passage of gas, the small base of which is connected to the discharge space (4) and the large base of which is connected to the gas inlet pipe (30).

19. Radiation source according to any one of claims 1 to 17, characterised in that the cathode (3, 8) comprises a central cylindrical hole for the passage of gas, which hole is connected, at one side, to the discharge space (4) and, at the other side, to the gas inlet pipe (30).